Koleopterologische Rundschau	73	19 – 29	Wien, Juni 2003

Notes on *Axinotoma* DEJEAN, 1829, with descriptions of two new species from Africa (Coleoptera: Carabidae, Harpalinae)

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Abstract

Two new species of *Axinotoma* DEJEAN, 1829 (Coleoptera: Carabidea), *A. tanzaniana* sp.n. and *A. pseudofallax* sp.n., from eastern Africa are described and the habitus and male genitalia of the new taxa and related species are illustrated. A map with the distribution and a key to the known species of *Axinotoma* is provided.

Key words: Coleoptera, Carabidae, Harpalinae, *Axinotoma*, taxonomy, new species, Africa.

Introduction

BASILEWSKY (1950) included seven species in the genus *Axinotoma* DEJEAN, 1829 and provided a key to the taxa known at that time. Later, the same author described *A. decellei* BASILEWSKY, 1968a and *A. latipalpis* BASILEWSKY, 1968b and recently SCIAKY & TOLEDANO (1995) described *A. viossati* from the Comoro Islands. The genus *Axinotoma* is characterized by its large head, fronto-ocular grooves present, mentum with tooth, elytra with dense non-setigerous punctures on the intervals (except one Madagascan species, with punctures almost absent near the apex), one discal setigerous puncture situated on interval 3, rarely missing (without setigerous punctures on intervals 5 and 7), metatarsomere 1 as long as 2 and 3 together.

The species considered by BASILEWSKY (1950) included two taxa, *A. posticalis* PÉRINGUEY, 1896 and *A. pseudornata* BASILEWSKY, 1948, with completely pubescent elytra in females (almost glabrous in males) and with mentum without a tooth. For this reason, CLARKE (1972) described the genus *Allonixus*, making *A. pseudornata* a synonym of *A. posticalis*.

The genus *Metarpalus* JEANNEL, 1946, mentioned also in a later monograph of Madagascan Carabidae (JEANNEL 1948) and including only two species endemic to Madagascar, was considered by NOONAN (1976, 1985) and SCIAKY & TOLEDANO (1995) as a synonym of *Axinotoma*. The latter includes 10 species at present (11 in LORENZ 1998, with *A. posticalis*).

The present-day distribution shows that *A. decellei* occurs in western Africa, *A. latipalpis* and *A. lepersonneae* BURGEON, 1942 occur in central Africa, *A. maynei* BURGEON, 1936 and *A. hulstaerti* BASILEWSKY, 1950 occur in western and central Africa, *A. obtuseangula* PÉRINGUEY, 1896 occurs in eastern and southern Africa, *A. fallax* DEJEAN, 1829 occurs in western, central and eastern Africa, *A. ambigena* (JEANNEL, 1946) and *A. perrieri* (JEANNEL, 1946) occur in Madagascar and *A. viossati* occurs in the Comoro Islands. Recently, I have seen the types of all the species belonging to genus *Axinotoma*, except *A. obtuseangula*, where I have seen a specimen compared with the type. Recent explorations of Tanzania and Kenya have allowed the discovery of two new species of this genus, whose description is the main purpose of this work.

Material & methods

Measurements were made with an ocular micrometer in a Leica MZ 12.5 stereoscopic binocular microscope. The total length was measured from the apex of the mandibles (closed) to the apex of the elytra. Measurements of body parts and abbreviations used for them in the text are:

El	length of elytra from base of scutellum to apex
Ew	maximum width of elytra
Pl	length of pronotum along median line
Pw	maximum width of pronotum

Indices used in this publication are Pw/Pl and El/Ew.

Photographs were made with a Minolta camera attached to a Leica MZ 12.5 stereoscopic binocular microscope.

Key to the *Axinotoma* species

1 Elytra without spots or bands, or yellowish apex 2

- Elytra with reddish or yellowish spots or bands, or with yellowish apex 7

2 Median lobe of the aedeagus with apical disc (Figs. 13, 14). Apical labial palpomere slender, constricted towards apex 3

- Median lobe of the aedeagus without apical disc (Figs. 15, 16, 17, 18). Apical labial palpomere stout, not constricted towards apex, frequently dilated 4

3 Elytra with flat intervals. Fig. 1, aedeagus as in Fig. 13. 10.1 – 10.8 mm – Tanzania..... ..... *tanzaniana* **sp.n.**

- Elytra with convex intervals. Fig. 2, aedeagus as in Fig. 14. 9 – 11 mm - W and C Africa.... *maynei*

4 Body broader, elytra with convex intervals. Fig. 6, aedeagus as in Fig. 18. 9.5 – 13.5 mm - C Africa ..... *latipalpis*

- Body narrower, elytra with flat intervals 5

5 Median lobe of the aedeagus with ostium deflected to the left side (Fig. 15), elytra without discal setigerous puncture on interval 3. Fig. 3. 9.1 – 9.8 mm – Kenya..... *pseudofallax* **sp.n.**

- Median lobe of the aedeagus with dorsal ostium or with ostium very slightly deflected to the left side (Figs. 16-17), elytra with discal setigerous puncture on interval 3 6

6 Pronotum with basal angles almost right, mentum with acute tooth. Fig. 4, aedeagus as in Fig. 16. 9.5 – 12 mm - W, C and E Africa ..... *fallax*

- Pronotum with basal angles distinctly obtuse, mentum with blunt tooth. Fig. 5, aedeagus as in Fig. 17. 10 – 12 mm - E and S Africa ..... *obtuseangula*

7 Elytra with completely yellowish apex, species from Madagascar and Comoro Islands 8

- Elytra without completely yellowish apex but with yellowish bands near the apex or with reddish or yellowish spots near the apex and near the shoulders, species from continental Africa 10

8 Median lobe of the aedeagus with ostium slightly deflected to the left side, species from Madagascar 9

- Median lobe of the aedeagus with dorsal ostium, species from Comoro Islands. Fig. 9. 6.9 – 8.5 mm. .....*viossati*

9 Elytra with dense non-setigerous punctures on the intervals, also near the apex. Fig. 8. 8.5 – 10.5 mm ..... *perrieri*

- Elytra without dense non-setigerous punctures near the apex. Fig. 7. 8 – 10.5 mm ..... *ambigena*

10 One reddish or yellowish, rounded spot on each elytron, near the shoulder, and one reddish or yellowish common spot near the apex. Median lobe of the aedeagus markedly twisted. Fig. 10. 9.5 – 10.5 mm - W and C Africa ..... *hulstaerti*

- One small yellowish spot near the shoulders and 3 yellowish bands near the apex. Median lobe of the aedeagus not twisted 11

11 Elytra with convex intervals, median lobe of the aedeagus with apical disc. Fig. 11. 10 – 12 mm - C Africa ..... *lepersonneae*

- Elytra with flat intervals, median lobe of the aedeagus without apical disc. Fig. 12. 11 – 12 mm - W Africa ..... *decellei*

Axinotoma tanzaniana sp.n.

DIAGNOSIS: Total length 10.1 - 10.8 mm (10.8 mm in holotype), body brown with testaceous legs, palpi and antennae, apical labial palpomere slender, constricted towards apex, elytra with flat intervals, median lobe of the aedeagus with apical disc. Distinguished from *A. maynei* by its elytra with flat intervals (elytra with convex intervals in *A. maynei*) and a different shape of the median lobe of the aedeagus. Distinguished from the species of the "*fallax* group" by the slender apical labial palpomere, constricted towards apex, and the median lobe of the aedeagus with an apical disc.

TYPE LOCALITY: Tanzania, Usambara Mts., Lushoto.

TYPE MATERIAL: Holotype ♂: "Tanzania, Usambara Mts., Lushoto, 08-11.05.1999, A. Kudrna Jr. lgt", coll. Facchini. Paratype: 1 ♀, Tanzania, Arusha, 02-05.05.1999, leg. A. Kudrna, coll. Facchini.

DERIVATIO NOMINIS: This name is derived from the country where these specimens were collected.

DESCRIPTION: Total length 10.1 – 10.8 mm (10.8 mm in holotype), body brown with testaceous legs, palpi and antennae; body wide, rather flat, fully winged. Habitus as in Fig. 1. Microsculpture effaced on head and elytra, very shallow on pronotum.

Head large, punctate, much narrower than pronotum, fronto-ocular grooves distinct. Labrum not concave at middle, clypeus with 1 seta on each side. Mentum with tooth, ligula not expanded at apex, slightly shorter than paraglossae. Apical labial palpomere slender, constricted towards apex. Eyes markedly convex, tempora short. Antennae with antennomere 1 not very long, 2 extremely short, 9-11 subequal in length, not very long; antennomeres 1-2 glabrous, 3-11 densely pubescent, except the base of the third one.

Pronotum wide, markedly transverse (index Pw/Pl = 1.61 in holotype), with narrow lateral gutter; sides rounded in the anterior third, straight or very slightly sinuate before hind angles, more constricted at anterior margin than at base, maximum width anterior to the middle, basal angles almost right. Lateral seta anterior to the middle. Anterior angles not protruding, rounded. Median longitudinal impression shallow. Basal impressions wide, indistinctly delimited, markedly punctate, one on each side of pronotum. Base bordered completely. Dorsal surface sparsely punctate in the middle, markedly punctate at sides and in basal impressions. Pro- meso- and metasternum, pro- meso- and metepisterna almost smooth, with only very few punctures. Metepisterna markedly longer than wide, constricted; prosternal projection unbordered, with some setae at apex.

Elytra wide (index El/Ew = 1.48 in holotype), rather flat, glabrous, maximum width posterior to the middle. Basal border entire, shoulders distinct, basal margin meeting lateral margin with a curve. Striae deep, complete, impunctate. Intervals flat, with dense non-setigerous punctures. Scutellar stria long, scutellar setigerous puncture present at base of scutellar stria, one discal

setigerous puncture situated on interval 3, adjoining stria 2. Umbilicate series composed of 25-27 setigerous punctures, without a gap between humeral and apical series. Abdomen almost smooth, with only very few punctures, last visible sternite with two setae on each side in both sexes.

Legs short, metatibiae almost straight, metatarsomere 1 as long as 2 and 3 together; onychium with few thin setae ventrally. Protarsomeres 1-4 of male dilated, with 2 rows of scale-like bristles ventrally, mesotarsomeres not dilated, without rows of scale-like bristles ventrally.

Aedeagus (Fig. 13) medium sized (3.2 mm), median lobe with dorsal ostium. Apex in lateral view slender, with apical disc, in dorsal view straight.

DISTRIBUTION: Known only from Tanzania: Usambara Mts. (Lushoto) and Arusha. The distribution of the species of the genus *Axinotoma* is given in Fig. 19.

AFFINITIES: *A. tanzaniana* sp.n. is similar to *A. maynei* but the former can be easily distinguished from the latter by its elytra with flat intervals (elytra with convex intervals in *A. maynei*) and a different shape of the median lobe of the aedeagus. Distinguished from the species of the "*fallax* group" by the slender apical labial palpomere, constricted towards apex, and the median lobe of the aedeagus with apical disc.

Axinotoma pseudofallax sp.n.

DIAGNOSIS: Total length 9.1 – 9.8 mm (9.8 mm in holotype), body brown with testaceous legs, palpi and antennae, apical labial palpomere stout, dilated towards apex, elytra with flat intervals, without discal setigerous puncture on interval 3, median lobe of the aedeagus without apical disc, ostium deflected to the left side. Distinguished from *A. maynei* and *A. tanzaniana* sp.n. by its stout apical labial palpomere, dilated towards apex, and the median lobe of the aedeagus without an apical disc. Distinguished from *A. fallax*, *A. obtuseangula* and *A. latipalpis* by the median lobe of the aedeagus with an ostium deflected to the left side, and the elytra without a discal setigerous puncture on interval 3.

TYPE LOCALITY: Kenya, Voi (Tsavo).

TYPE MATERIAL: Holotype ♂: "Kenya, 22.XI-2.XII.1996, Voi (Tsavo), M. Snizek leg.", coll. Facchini. Paratype: 1 ♂, Kenya, 30 km S Malindi, Arabuko Sokoke forest, 16.VI.1998, coll. Facchini.

DERIVATIO NOMINIS: This name is derived from a similar habitus to *A. fallax*.

DESCRIPTION: Total length 9.1 - 9.8 mm (9.8 mm in holotype), body brown with testaceous legs, palpi and antennae; body rather flat, fully winged. Habitus as in Fig. 3. Microsculpture effaced on head, very shallow on pronotum, made up by transverse meshes on the elytra.

Head large, punctate, much narrower than the pronotum, fronto-ocular grooves distinct. Labrum not concave at the middle, clypeus with 1 seta on each side. Mentum with tooth, ligula not expanded at apex, slightly shorter than paraglossae. Apical labial palpomere stout, dilated towards apex. Eyes markedly convex, tempora short. Antennae with antennomere 1 not very long, 2 extremely short, 3-11 subequal in length, not very long; antennomeres 1-2 glabrous, 3-11 densely pubescent, except the base of the third one.

Pronotum wide, markedly transverse (index Pw/Pl = 1.56 in holotype), with narrow lateral gutter; sides rounded in the anterior third, straight or very slightly sinuate before hind angles, more constricted at anterior margin than at base, maximum width anterior to the middle, basal angles almost right or slightly obtuse. Lateral seta anterior to the middle, anterior angles not protruding, rounded. Median longitudinal impression shallow. Basal impressions wide, indistinctly delimited, markedly punctate, one on each side of pronotum. Base bordered completely. Dorsal surface sparsely punctate at middle, markedly punctate at sides and in basal impressions. Pro-

meso- and metasternum, pro- and mesoepisterna sparsely punctate, metepisterna punctate. Metepisterna markedly longer than wide, constricted; prosternal projection unbordered, with some setae at apex.

Elytra quite long (index El/Ew = 1.61 in holotype), rather flat, glabrous, maximum width at middle. Basal border entire, shoulders distinct, basal margin meeting lateral margin with a curve. Striae not very deep, complete, punctate. Intervals flat, with dense non-setigerous punctures. Scutellar stria long, scutellar setigerous puncture present at base of scutellar stria, without a discal setigerous puncture on interval 3. Umbilicate series composed of 23-25 setigerous punctures, without a gap between humeral and apical series. Abdomen almost smooth, slightly punctate and pubescent only near the base, last visible sternite with 2 setae on each side in male.

Legs short, metatibiae straight, metatarsomere 1 as long as 2 and 3 together; onychium with few thin setae ventrally. Protarsomeres 1-4 of male dilated, with 2 rows of scale-like bristles ventrally, mesotarsomeres not dilated, without rows of scale-like bristles ventrally.

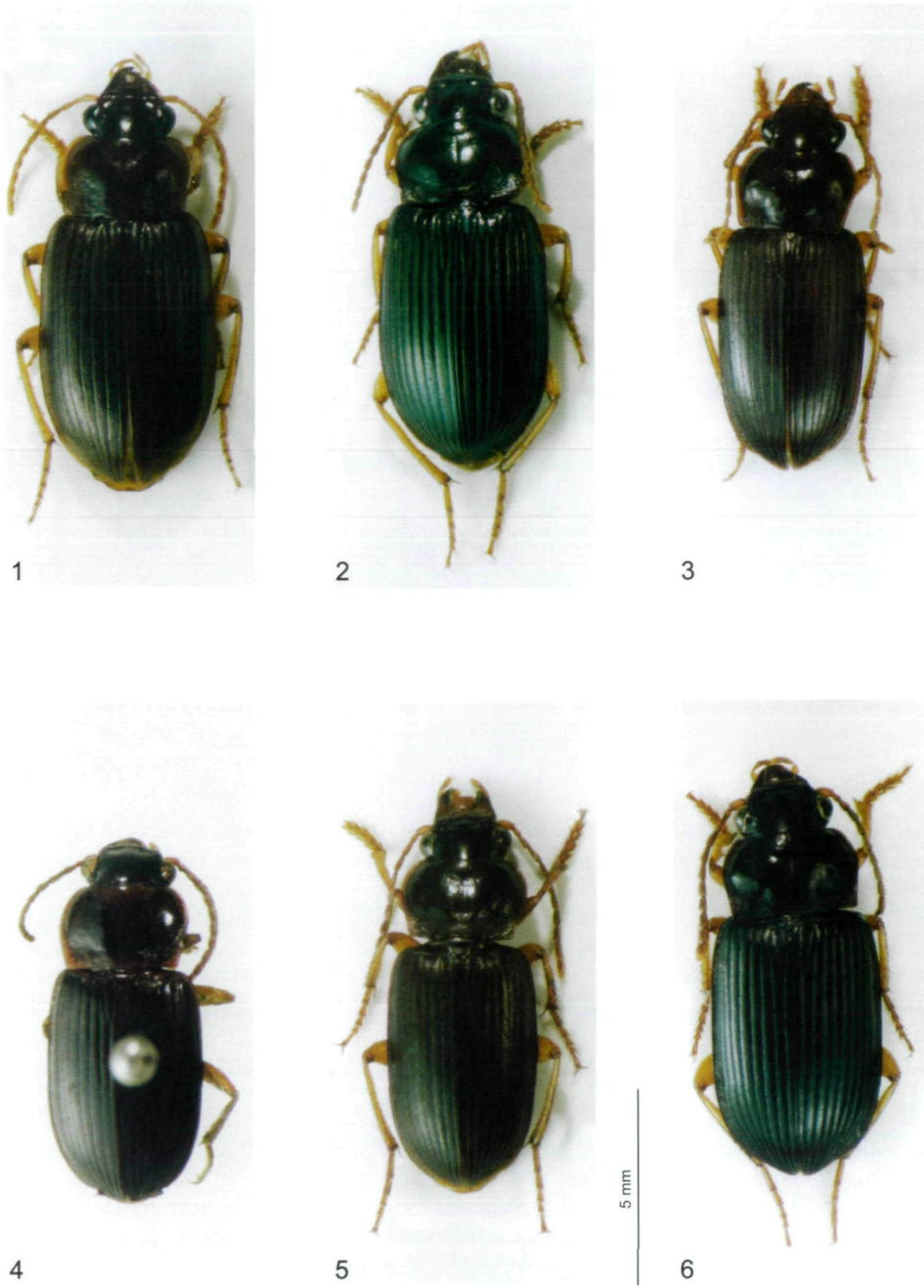
Aedeagus (Fig. 15) medium sized (2.4 - 2.6 mm), median lobe with ostium deflected to the left side. Apex in lateral view slender, without apical disc.

DISTRIBUTION: Known only from Kenya: Voi and Malindi. The distribution of the species of the genus *Axinotoma* is given in Fig. 19.

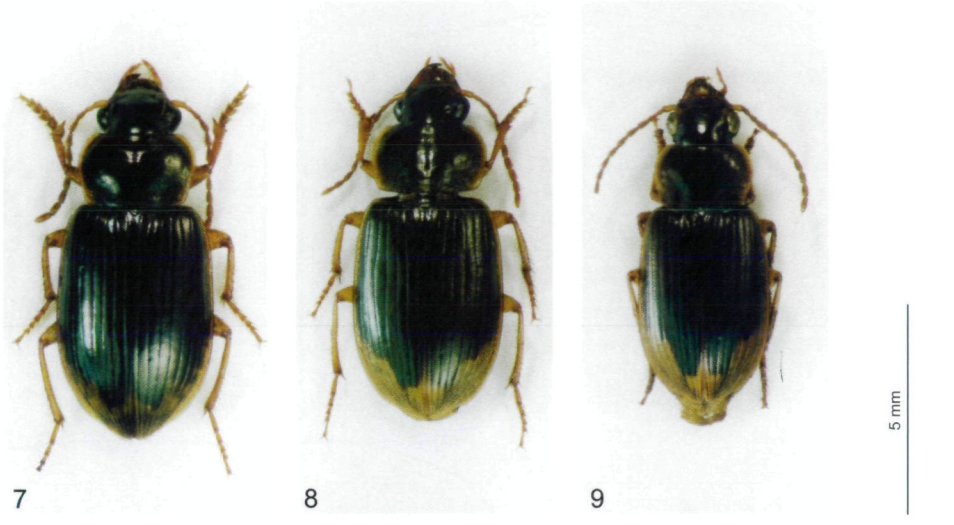
AFFINITIES: The new species is externally very similar to *A. fallax* and *A. obtuseangula*, but it can be easily distinguished from them by a median lobe of the aedeagus with ostium deflected to the left side and the elytra without discal setigerous puncture on interval 3. It can be distinguished from *A. latipalpis* through the characters mentioned above and by its narrower body and flat intervals of the elytra. Finally, the new species can be distinguished from *A. maynei* and *A. tanzaniana* by its stout apical labial palpomere, dilated towards apex, and the median lobe of the aedeagus without an apical disc.

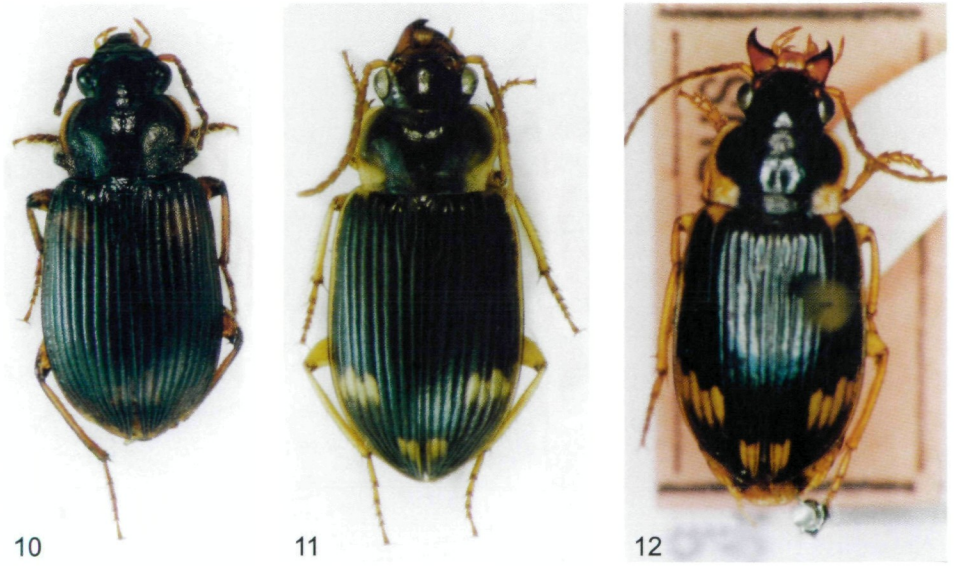
Considerations

The only consistent character used by BASILEWSKY (1950) to distinguish between species of *Axinotoma* and *Metarpalus* is the position of the ostium of the median lobe of the aedeagus: dorsal in *Axinotoma* and slightly deflected to the left side in *Metarpalus*. Later, NOONAN (1976, 1985) argued that the ostium varies in position within other genera of Harpalina (such as *Trichotichnus* MORAWITZ, 1863) and position of the ostium is not constant enough to warrant generic or subgeneric separation of species. SCIAKY & TOLEDANO (1995) confirmed this observation: *A. viossati* (Fig. 9) is so similar to *A. perrieri* (Fig. 8) that a separation based only on external characters is difficult, but the fact that the ostium of the median lobe of the aedeagus is in dorsal position in *A. viossati* and slightly deflected to the left side in *A. perrieri* makes distinguishing these species easier. All the known taxa of *Axinotoma* from continental Africa have the ostium in dorsal position except one of the new species, *A. pseudofallax* (Fig. 3), externally very similar to *A. fallax* (Fig. 4) and *A. obtuseangula* (Fig. 5), but with the ostium of the median lobe of the aedeagus deflected to the left side, like *A. perrieri* (Fig. 8) and *A. ambigena* (Fig. 7), which occur in Madagascar. This character supports the observations mentioned above and clearly indicates that it varies among the species of the genus *Axinotoma* and it is useful only for discrimination at species level. It is very likely that this character (ostium deflected to the left side) has evolved separately in *A. pseudofallax* and in the presumed common ancestor of the two Madagascan species, considering the remarkable morphological differences between the taxa of the "*fallax* species group" and "*Metarpalus* species group".

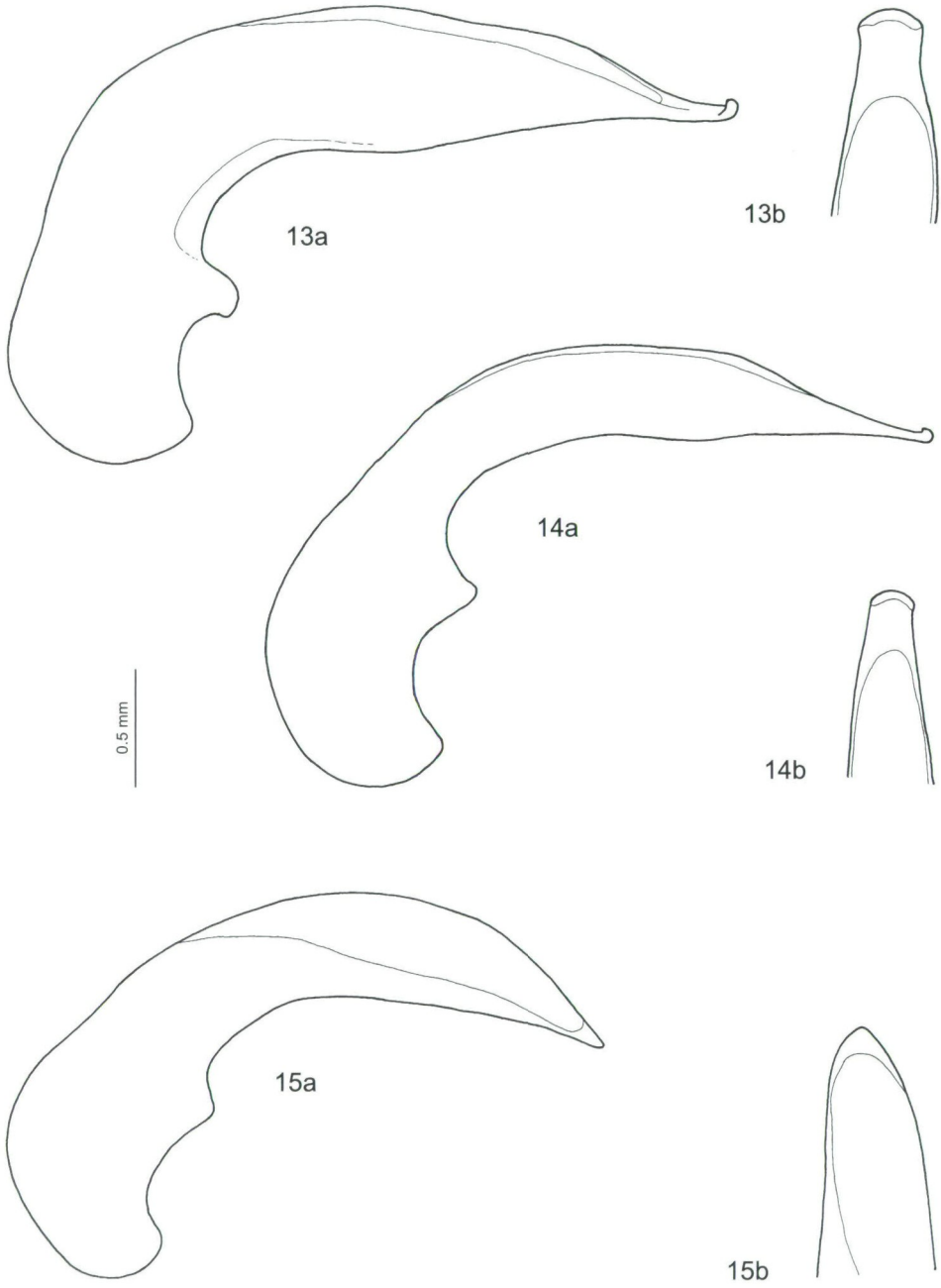


Figs. 1 – 6: Photographs of the habitus of 1) *Axinotoma tanzaniana* sp.n., holotype; 2) *A. maynei*, from Sassandra, Ivory Coast; 3) *A. pseudofallax* sp.n., holotype; 4) *A. fallax*, type; 5) *A. obtuseangula,* from Mtubatuba, South Africa; 6) *A. latipalpis*, from Rwera, Uganda.

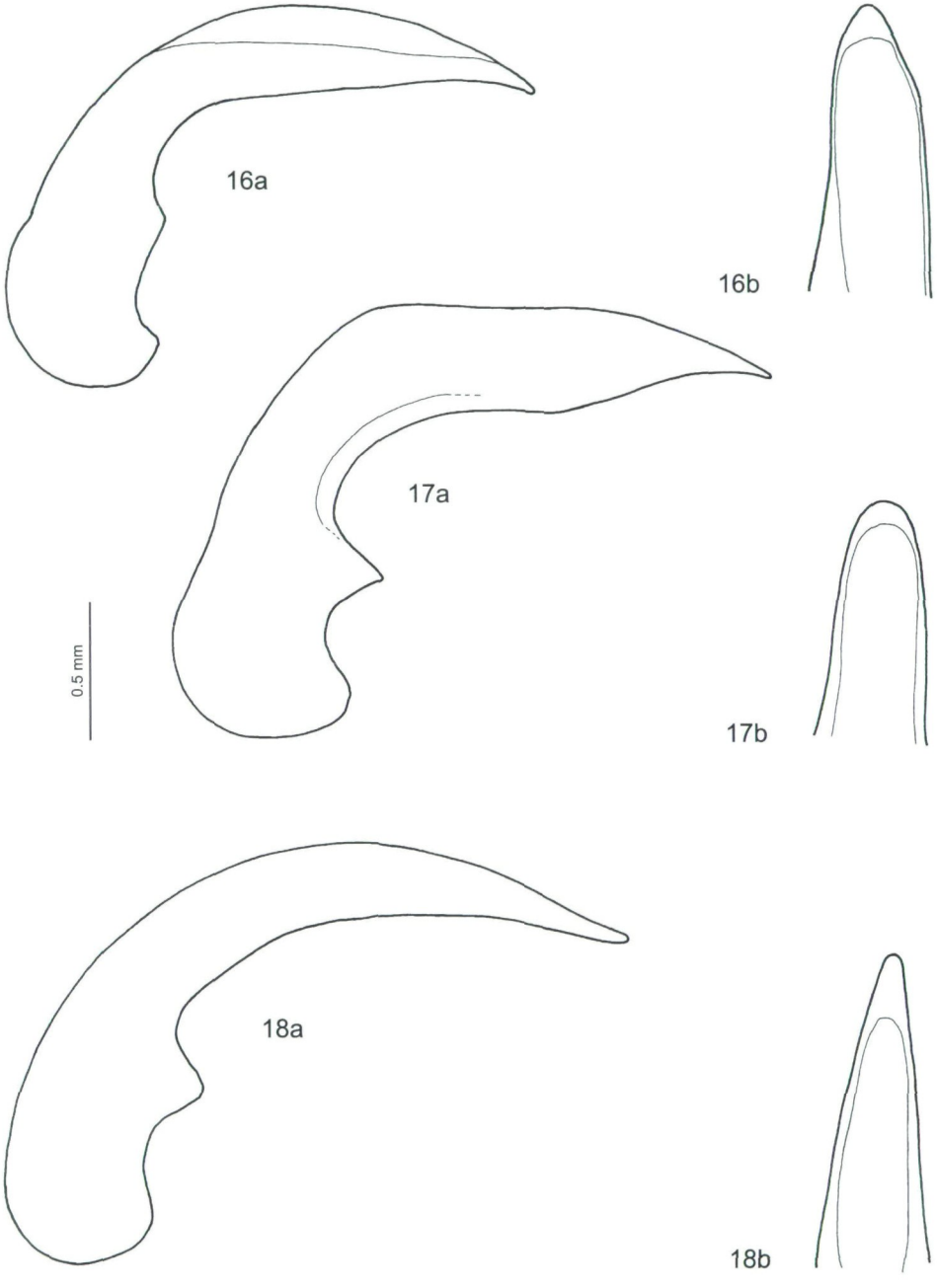




Figs. 7 – 12: Photographs of the habitus of 7) *Axinotoma ambigena*, from Moramanga, Madagascar; 8) *A. perrieri*, from Ambodimanga, Madagascar; 9) *A. viossati*, paratype from La Convalescence, Mayotte; 10) *A. hulstaerti*, Sassandra, Ivory Coast; 11) *A. lepersonneae*, from Mubende, Uganda; 12) *A. decellei*, holotype.



Figs. 13 – 15: Left view (a) and dorsal view, apical part (b) of the median lobe of the aedeagus of 13) *Axinotoma tanzaniana* sp.n., holotype; 14) *A. maynei*, from Sassandra, Ivory Coast; 15) *A. pseudofallax* sp.n., holotype.



Figs. 16 – 18: Left view (a) and dorsal view, apical part (b) of the median lobe of the aedeagus of 16) *Axinotoma fallax*, type; 17) *A. obtuseangula,* from Mtubatuba, South Africa; 18) *A. latipalpis*, from Rwera, Uganda.

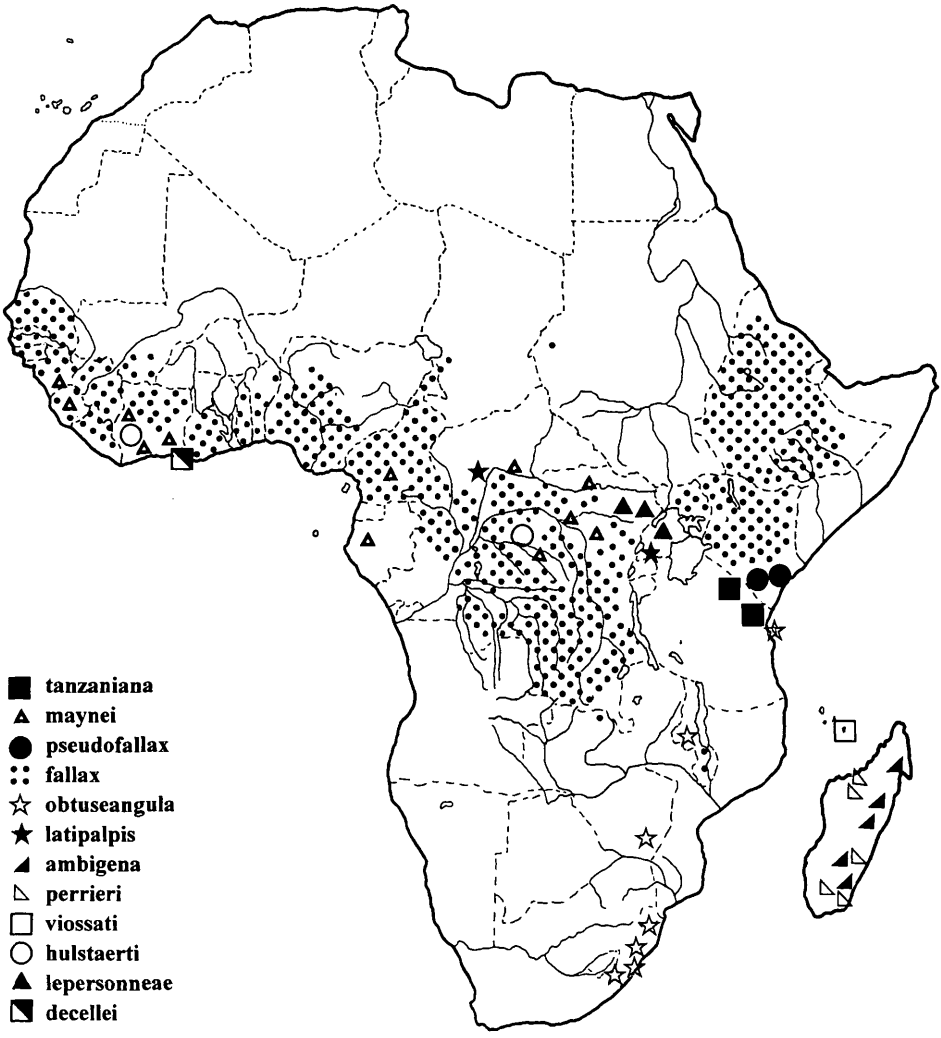


Fig. 19: Distribution of the species of the genus *Axinotoma*.

Acknowledgements

I wish to thank my friend Dr. P. Marek (California Academy of Sciences) for his advice about the linguistic aspects. I express here my warmest thanks to Dr. M. De Meyer (Musée Royal de l'Afrique Centrale, Tervuren) and Dr. T. Deuve (Muséum National d'Histoire Naturelle, Paris) for allowing me to examine typical material.

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